Regular Examination of the Statistical Accuracy of the *Tankan*

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Research and Statistics Department
Bank of Japan

The Bank of Japan examines the statistical accuracy of the *Tankan* (Short-Term Economic Survey of Enterprises in Japan) regularly (once a year in principle), to prevent the lowering of statistical accuracy due to a decrease in the number of sample enterprises resulting from bankruptcies, mergers, and other factors. When accuracy is not sufficient, the Bank adds new sample enterprises. The recent examination showed that the statistical accuracy after the December 2022 survey satisfied the criteria. The total number of the sample enterprises for the March 2023 survey will be 9,636 (including 257 financial institutions, 170 business consultants & pure holding companies and 583 sample enterprises in the Survey on Overseas Business Activities).[1]

> Note: For details of the statistical accuracy of the *Tankan*, please refer to "Explanation of the *Tankan* (Short-Term Economic Survey of Enterprises in Japan)," February 2023.

Details of the examination are as follows.

1. Sample Distribution

In the *Tankan*, the population is determined as private enterprises with capital of 20 million yen or more (excluding "financial institutions" and "business consultants & pure holding companies"). The population is classified into 384 strata by industry, enterprise size and sales for the estimation of the population total.[2] The Bank examined whether there is a statistically significant difference in these strata between the sample and population distributions.[3] The result showed that there was no stratum in which the

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[1] 583 sample enterprises in the Survey on Overseas Business Activities includes the 573 sample enterprises of the *Tankan* and the Survey of Business Consultants & Pure Holding Companies.

[2] In the *Tankan*, the Bank places the restriction on selecting sample enterprises in order to limit disturbance to the estimates due to an idiosyncratic factor of a sample enterprise: the sampling ratio of each stratum is maintained at 0.5 percent or more. The Bank verified that there was no stratum with sampling ratio of less than 0.5%, along with the examination of the statistical accuracy on the above.

[3] The "test of the goodness of fit" using chi-square distribution is used in the regular examination. This method tests the null hypothesis, H_0: "There is no significant difference between the sample and population distributions." When the hypothesis is statistically rejected, the sample distributions are deemed to deviate from the population distributions.

sample distribution was deemed to deviate from the population distribution.[4]

2. Standard Error Ratios

The Bank examined the standard error ratio of sales [5] in manufacturing and nonmanufacturing for each enterprise size in the *Tankan*. The results showed that the standard error ratios remained within the criteria — 3% or less for manufacturing and 5% or less for nonmanufacturing — as listed in the table below.[6]

Standard Error Ratios of Sales

		Large Enterprises	Medium-Sized Enterprises	Small Enterprises
Manufacturing	Actual	1.1%	1.7%	1.9%
	Criterion	3.0% or less		
Nonmanufacturing	Actual	1.3%	2.0%	1.6%
	Criterion	5.0% or less		

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[4] The Bank also examined whether there is a statistically significant difference in the strata between the sample and population distributions in the Survey of Financial Institutions, the Survey of Business Consultants & Pure Holding Companies and the Survey on Overseas Business Activities. (In the Survey of Financial Institutions, the population is determined as financial institutions with 10 employees or more and then classified into 22 strata by sector and the number of employees. In the Survey of Business Consultants & Pure Holding Companies, the population is determined as private enterprises that are "business consultants & pure holding companies" with capital of 20 million yen or more and then classified into 4 strata by sales. In the Survey on Overseas Business Activities, the population is determined as private parent enterprises excluding "financial institutions", with capital of 1 billion yen or more, at the top of a consolidated business group with sales to overseas external customers or overseas subsidiaries/branches, and then classified into 73 strata by sector and total sales.) The result showed that there was no stratum in which the sample distribution was deemed to deviate from the population distribution.

[5] Standard error ratio shows how accurate an estimate of the survey population mean is. It is calculated by dividing the standard deviation of the sample mean by the survey population mean.

[6] The Bank also examined the standard error ratios of fixed and software investment (excluding land purchasing expenses) for overall financial institutions in the Survey of Financial Institutions, and total sales for both manufacturing and nonmanufacturing on Overseas Business Activities. The result showed that the standard error ratios were 5.0% (in the Survey of Financial Institutions), 1.7% (for manufacturing on Overseas Business Activities) and 3.7% (for nonmanufacturing on Overseas Business Activities). They were within the criterion, 10%.